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ABSTRACT

The guidelines for carpentry performance objectives were written for vocational educators in order to insure that their programs are fulfilling the training requirements of today's job market. The document outlines eight uses of performance objectives and provides sample employability profiles, training achievement records, and a carpentry learning activity package. The major portion of the document (27 pages) outlines carpentry performance objectives for the areas of pre-construction operations; tools and equipment; footing, foundation, and concrete forms; floor framing; wall framing; roof framing; roofing; wooden and metal scaffolds; exterior finishes; insulation and vapor barriers and interior finishes. A 20-item bibliography is appended. (BP)

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CARPENTRY PERFORMANCE OBJECTIVES

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1976

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Gerald F. Day and Dennis R. Herschbach
Project Co-Directors

INTRODUCTION

The performance objective is a useful instructional tool. It is a description of what an individual should be able to do when he or she has acquired a certain skill. The performance objectives presented in the following pages have been written as guidelines for vocational educators in order to insure that their programs are fulfilling the training requirements of today's job market. The user of these objectives should understand the following characteristics:

Objective Format: The format of performance objectives can take many forms. The following objectives have been written so as not to be so specific and limiting that they become hard to incorporate into an existing curriculum, or so general that they do not cover the required skills.

Most performance objectives contain three parts: 1) a description of the conditions under which the student will be expected to display the stated behavior; 2) a statement of the observable and measurable behavior anticipated at the end of a learning experience; and, 3) a precise description of the acceptable performance or criterion level.

Concerning the conditions, these objectives are preceded with the statement "Given the proper tools, materials and conditions, the student will be able to:" The teacher is expected to be cognizant of what tools, materials, equipment, and environmental conditions are involved in each task. To have listed all the specific job conditions within this publication would have been restrictive and repetitious. In addition, conditions usually vary according to the job, employer, location, and other variables.

The behavior to be displayed is expressed in observable and measurable terms. Only essential skills have been stated. Related or "nice-to-know" information has been avoided.

The stating of a performance or criterion level is a critical element in an objective. Many times a criterion level is arbitrarily set, such as 80% of a teacher-made test or identifying 9 out of 10 tools. The performance level in the following objectives has been set according to trade standards. An objective that does not specify an exact performance level

is one which the instructor should refer to a locally-accepted industrial practice, local building code, architectural or structural specifications, or is a requirement indigenous to a particular project. Although trade standards generally have time limitations, no restriction was placed on time. It is hoped that completion time for each task will be similar to on-the-job performance.

Entry Level: These objectives represent minimum skills necessary to gain job entry in the field of carpentry as a construction carpenter (D.O.T. 860.381). Of course, different jobs and specialties within carpentry require different skills, but it is best to train for a generalist position. Skills for different carpentry specialists can be found in The Dictionary of Occupational Titles.

Terminal: These objectives describe only those significant competencies which are to be mastered by the end of the training program. In order to achieve each terminal objective, several intermediate or enabling objectives may have to be used. Enabling objectives vary according to student population characteristics, availability of physical plant, materials and equipment, and other local educational agency variables.

Program: These objectives encompass learning outcomes for an entire training program. In other words, one or more courses can be structured from the objectives. It must be reiterated that these objectives are guidelines and are intended to be flexible in order to fit the specific environment of the user. The objectives do not necessarily reflect a mandatory sequence.

Safety: No specific performance objectives on safety have been written since it is essential that safety be stressed throughout the curriculum. Each task should be done in a safe and efficient manner. The instructor should convey the current OSHA laws to the students throughout the program.

Evaluation: The decision as to what grade a student will receive for achieving all or some of the objectives is a local educational agency decision. Some districts choose to include factors other than the achievement of objectives as the basis for assigning grades. Many factors may affect the decision as to whether credit for a course should be given to an individual who has achieved less than the minimum objectives.

HOW TO USE PERFORMANCE OBJECTIVES

These performance objectives are only a starting point for a performance-based curriculum to be incorporated into a school. The instructor must become involved in the curriculum process in order to tailor instructional materials and rescurces to the local situation.

Among the possible uses of these performance objectives are:

1. Validating the content of a curriculum.

2. Determining what learning activities should be conducted to achieve the desired outcomes.

3. Evaluating and selecting textbooks, occupational references, and instructional materials.

4. Developing tool and equipment lists.

5. Planning and building needed physical facilities.

6. Locally developing instructional aids, such as employability profiles and learning activity packages.

7. Selecting or constructing criterion-referenced measures which can be directly related and interpretable in terms of competencies achieved.

8. Assisting in the career development and counseling of students.

9. Improving the articulation and standardization among programs.

Contained in the following pages are examples of two performance-based instructional aids which are derived from performance objectives. An employability profile or training achievement record can be developed to record a student's progress through the curriculum. This profile can be used to communicate one's skill competencies to prospective employers, parents, other teachers, and to the student. Such a descriptive, criterion-referenced recording system conveys much more than a letter grade of A, B or C.

The other instructional aid included is a learning activity package (LAP) or module. A LAP can be used to cover each terminal performance objective. It is designed to focus upon one skill. This aid can provide for individualized, student-paced, and student-directed learning. Carpentry LAPs may be purchased from such organizations as Learn Fast Systems in Yardville, New Jersey and Division of Continuing Education Publications in Portland, Oregon, or can be developed by the teacher. Helpful references for writing LAPs are listed in the bibliography of this publication.

EMPLOYABILITY PROFILE

OSWEGO COUNTY BOARD OF COOPERATIVE EDUCATIONAL SERVICES

MEXICO, NEW YORK 13114
PHONE: 315-963-7251

Name _____ Home School _____ Grade _____

Course CARPENTRY Date _____ Quarter 1st__ 2nd__ 3rd__ Final__

The following is a list of operations and skills that the above student has been exposed to, and instructor's appraisal of his/her entry level employability in these areas. These operations have been accompanied by a significant amount of classroom work in related theory.

- HAND TOOLS
  - Measuring & Layout Tools
  - Saws
  - Planes & Chisels
  - Boring Tools
  - Fastening Tools
  - Holding Tools
  - Prying Tools
  - Sharpening Tools
  - Care & Maintenance
- PORTABLE POWER TOOLS
  - Circular Saws
  - Saber Saws
  - Electric Drills
  - Power Planes
  - Routers
  - Sanders
  - Staplers & Nailers
  - Care & Maintenance
- STATIONARY WOODWORKING MACHINES
  - Radial Arm Saw
  - Table Saw
  - Jointer & Planer
  - Band Saw
  - Shaper
  - Disk & Belt Sander
  - Care & Maintenance
- SAW FILING EQUIPMENT
  - Automatic Saw Filer
  - Circular Saw Grinder
  - Retoother
  - Hand Setter
  - Care & Maintenance
- LEVELING INSTRUMENTS
  - Setting Up Instrument
  - Sighting & Leveling
  - Care & Maintenance
- BUILDING MATERIALS
  - Grades & Kinds of Woods
  - Plywood
  - Wood Identification
  - Lumber Sizes & Estimating
  - Non-Wood Materials
  - Metal Fasteners
  - Adhesives
- PLANS, SPECIFICATIONS, CODES
  - Blueprint Reading
  - Sketching, Scaleing, & Symbols
  - Bldg. Specificatoons & Codes
  - Estimating
- FOOTINGS & FOUNDATIONS
  - Layout & Batter Boards
  - Excavation
  - Wall Forms & Footing Forms
  - Estimating Concrete & Block
- FLOOR FRAMING
  - Types of Framing
  - Girders, Beams & Headers
  - Installs, Joists, & Bridging
  - Installs, Sills
  - Layout of Joists & Openings
- WALL & CEILING FRAMING
  - Understands Parts of Wall Frame
  - Layout of Plate & Openings
  - Constructs Wall Sections
  - Application of Wall Sheating
  - Installs Ceiling Joists
  - Estimating of Materials
- ROOF FRAMING
  - Roof Types & Parts of Roof Frame
  - Layout Terms & Principles
  - Layout Rafters
  - Use of Rafter Table
  - Roof Truss Construction
  - Roof Sheating
  - Estimating
- ROOFING MATERIALS
  - Types of Materials & Terms
  - Application of Roofing
  - Gutters & Dripedge
  - Estimating Materials
- WINDOWS & EXTERIOR DOORS
  - Types of Windows & Terms
  - Installing Windows
  - Types of Exterior Doors & Terms
  - Installing Doors
  - Installing Window & Door Hardware
- EXTERIOR WALL FINISH
  - Cornice Construction
  - Exterior Siding
  - Installation & Maintenance
  - Estimating
- THERMAL & SOUND INSULATION
  - Types of Insulation
  - Installing Methods
  - Estimating
- INTERIOR WALL & CEILING FINISH
  - Lath & Plaster
  - Gypson Wallboard
  - Hardboard Panels
  - Suspended Ceilings
  - Estimating Materials
- FINISH FLOORING
  - Types of Wood Flooring & Installation
  - Installing Resilient Floor Tile
  - Installing Carpeting
  - Estimating
- STAIR CONSTRUCTION
  - Types of Stairs & Terms
  - Stringer Layout
- DOORS & INTERIOR TRIM
  - Installing Door Frames
  - Hanging Doors
  - Install Casing, Base, & Shoe
  - Installing Kitchen Cabinets
  - Install Window Trim
- PREFABRICATION
- CARPENTRY AS A CAREER

WORK HABITS	IGNORES DIRECTIONS	FOLLOWS SOME DIRECTIONS, WORKS INEFFICIENTLY	FOLLOWS DIRECTIONS AND WORKS SATISFACTORILY	STEADY CONSCIENTIOUS WORKER	VERY ACCURATE RESOURCEFUL AND EFFICIENT	MOTIVATION	APATHETIC	SPORADICALLY MOTIVATED	GENERALLY MOTIVATED	INTERESTED IN EXCELLING	HIGHLY INVOLVED AND SELF-MOTIVATED
SAFETY HABITS	SLOPPY AND HAZARDOUS	FAIR NEEDS IMPROVEMENT	GENERALLY WORKS SAFELY	MEETS REQUIRED SAFETY STANDARDS	NEAT CONSCIENTIOUS AND CAREFUL	INITIATIVE	REQUIRES CONSTANT PRESSURE	NEEDS OCCASIONAL PROMPTING	DOES ASSIGNED WORK	OCCASIONALLY SEEKS EXTRA WORK	SEEKS AND RECOGNIZES WORK THAT NEEDS DONE
WORK AFTER BELL	VERY SLOPPY AND UNCONSCIENTIOUS	INCONSISTENT AND UNCONSCIENTIOUS	ADEQUATE	THOROUGH	PRIDE IN NEATNESS AND CARE IN PERFORMING	EFFORT	SLOPPY	APPLIES MINIMAL EFFORT	DOING SATISFACTORY WORK	SOMETIMES DETERMINED	DETERMINED TO DO BEST
CLEAN AREA AFTER USE	OFTEN NOT IN WORK AREA	MAKES EXCUSES TO LEAVE WORK AREA	GENERALLY IN WORK AREA	NEVER LEAVES WORK AREA	ALWAYS WORK ASSIGNED	PEER RELATIONS	UNCOOPERATIVE	SOMETIMES HARD TO WORK WITH	GENERALLY COOPERATIVE	WORKS WELL WITH OTHERS	OUTSTANDING TEAM AND LEADERSHIP
SELF-ESTEEM	NO SELF-CONFIDENCE	INSECURE SELF-CONFIDENCE DEFENSIVE	BALANCED ATTITUDE	POSITIVE SELF EVALUATION	SELF-CONFIDENT AND SECURE	LEADERSHIP	UNABLE TO LEAD	RESIGNS TO FOLLOW	SHOWS LEADERSHIP WHEN REQUESTED	VOLUNTARILY DISPLAYS LEADERSHIP	MODEL THINGS GO
INTEGRITY	NOT TRUSTWORTHY	ERRATIC	SINCERE	RELIABLE AND DEPENDABLE	EXCEPTIONALLY TRUSTWORTHY	REACTION TO AUTHORITY	HOSTILE	INDIFFERENT	ACCEPTING	GENERALLY COOPERATIVE	EXCEPTIONALLY COOPERATIVE
RESPONSIBILITY	UNRELIABLE	SOMETIMES RELIABLE	USUALLY RELIABLE	CONSCIENTIOUS	ASSUMES RESPONSIBILITY VERY WELL	TOTAL DAYS ABSENT					

TEACHER'S COMMENTS _____

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TRAINING ACHIEVEMENT RECORD

Name _____ SSN _____ Date Trainee Entered Training _____

Title CARPENTER, CONSTRUCTION DOT Code 860.381 Certified by _____ Form No. 440.84 A

Achieved Individual Marketable Skill		PERFORMANCE				KNOWLEDGE			
		1	2	3	4	a	b	c	d
Safety									
1. Practice safety on the job	4d								
2. Know & use safe practice handling tools, woodworking machinery	4d								
General									
3. Know & understand carpenter terminology	4d								
4. Use & maintain common hand tools	3c								
5. Use & maintain measuring tools & equipment	3c								
6. Use & maintain power operated woodworking machines	3c								
7. Read, understand & interpret building sketches	2b								
Foundations, Walls, Floors & Stairs									
8. Lay out building lines & set stakes for grading	3c								
9. Build & place straight concrete forms	3c								
10. Line up & brace concrete walls & columns	3c								
11. Lay out footings, build or place forms & brace	3c								
12. Build irregular concrete forms	3c								
13. Lay out & cut stairs & treads; install railings	2b								
Framing (Foundations & Walls)									
14. Lay out & frame sills & girders	3c								
15. Frame & set floor joists	3c								
16. Lay out walls & partitions	3c								
17. Erect walls & partitions	3c								
18. Install sheathing & plaster grounds	3c								
Roofs									
19. Frame & set common rafters	3c								
20. Frame & set valley rafters	3c								
21. Frame & set hip rafters	3c								
22. Frame & set jack rafters	3c								
23. Apply sheathing, composition shingles & other types of roof coverings	3c								
Exterior Millwork									
24. Determine correct tools & materials, supplies for task	2b								
25. Operate skill saw, electric drill & sander	3c								
26. Set up & operate bench saw	3c								
Interior Wall Coverings									
27. Apply wood coverings	3c								
28. Apply composition, sheet rock or fiber board	3c								
29. Install baseboards	3c								
Floors									
30. Lay sub-flooring	3c								
31. Lay hardwood flooring	3c								
32. Build & place forms for concrete floors	3c								

TRAINING ACHIEVEMENT RECORD

Interior Finish									
33. Cut & fit base and mouldings	3c								
34. Set door jambs; fit & hang doors	3c								
35. Fit & hand windows	3c								
36. Fit & fasten hardware	3c								
Remodeling									
37. Install aluminum & vinyl siding	3c								
38. Install combination sorm windows & doors	3c								
39. Lay new roofing materials	3c								
40. Install aluminum porch enclosures, awnings, patio covers	3c								
41. Install metal porch rails & stair rails	3c								
42. Install overhead garage coors & radio-controlled garage door opener	3c								
43. Install plastic, asbestos & vinyl floor coverings	3c								
Additional Related Training Elements									

EDUCATION, TECHNICAL KNOWLEDGE--JOB PHYSICAL PROFILE		PERFORMANCE 1	2	3	4	KNOWLEDGE a	b	c	d
1. Use instructions furnished in written, oral, diagram or schedule form	4d								
2. Use arithmetic; apply practical algebra and geometry	4d								
3. Read and interpret technical materials	4d								
4. Prepare reports and summaries, conforming to good English usage	4d								
1. Able to lift 50 lbs.maximum;carry to 25 lbs;walk & stand continuously	4								
2. Able to climb & use back muscles & legs to stoop,kneel,crouch,crawl	4								
3. Able to use fingers, hands, arms to reach, handle, feel	4								
4. Able to see efficiently	4								
5. Work both indoors & outdoors where physical hazards exist	4								

ATTITUDES AND PROFESSIONAL ETHICS		ATTITUDES & ETHICS I	II	III	IV	V
1. Demonstrate correct safety practices on the job	V					
2. Maintain appropriate personal hygiene and appearance	III					
3. Arrive on the job on time	IV					
4. Is on the job every day	IV					
5. Perform work of consistently good quality	IV					
6. Function cooperatively with fellow workers	III					
7. Treat others courteously	III					
8. Work with even temperament	III					
9. Accept constructive criticism	IV					
10. Follow instructions willingly	IV					
11. Deal well with supervision	IV					
12. Willingly work unusual schedules when required	III					
13. Handle proprietary information discreetly; respect confidences	III					
14. Respect worth of equipment, company and personal property	IV					

Name_____ SSN_____ Date Trainee Entered Training_____

Title CARPENTER, CONSTRUCTION DOT Code 860.381 Certified by_____ Form No. 440.84 A

TRAINING ACHIEVEMENT RECORD

GENERAL EMPLOYABILITY TRAITS (proficiency code key)		
FACTORS	**SCALE VALUE**	**DEFINITION**
PERFORMANCE LEVEL	1	EXTREMELY LIMITED: Can do simple parts of task—Needs to be told/shown how to do most of task—Needs extremely close supervision
	2	PARTIALLY PROFICIENT: Can do most parts of task—Needs help only on hardest parts—May not meet local demands for speed and accuracy—Needs close supervision
	3	COMPETENT: Can do all parts of task—Needs only spot check of completed work—Meets minimum local demands for speed and accuracy—Needs job entry supervision
	4	HIGHLY PROFICIENT: Can complete task quickly and accurately—Can direct others in how to do the task—Needs normal supervision
KNOWLEDGE LEVEL	a	NOMENCLATURE: Can identify parts, tools, and understand simple facts about task—Can identify related basic facts and terms
	b	PROCEDURES: Can name most steps in doing task—Needs help interpreting written instructions—Can explain basic facts and state general principles
	c	TECHNIQUES AND PRINCIPLES: Can explain how and when task must be done; why each step is needed—Can interpret written and oral instructions—Can analyze facts/principles
	d	OPERATING PROFICIENCY: Identify, measure, and use trouble shooting techniques resolving task related problems—Can evaluate conditions and make proper decisions
PERSONAL BEHAVIOR	I	UNRELIABLE, inappropriate personal appearance, disrupting, uncooperative, disinterested, disrespectful
	II	OCCASIONALLY reliable, cooperative, responsible, interested, respectful, and satisfactory personal appearance
	III	USUALLY reliable, cooperative, responsible, interested, respectful and appropriate personal appearance
	IV	CONSISTENTLY reliable, cooperative, responsible, interested, respectful and appropriate personal appearance
	V	EXCEPTIONALLY reliable, cooperative, responsible, interested, respectful and appropriate personal appearance, demonstrates self-assurance

EXPLANATION

Occupational skills can be used alone or together in any combination to define a level of training achievement for a specific job skill. Example: 1b and/or b. General Employability Traits are to be used when rating attitude and professional behavior.

IMPORTANT: Recommended changes in format, line items, and employability traits should be forwarded to: Chief, Vocational Training, Office of Program Development, Job Corps, MA/DOL, Washington, D. C. 20213

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CARPENTRY LEARNING ACTIVITY PACKAGE

UNIT 4: Floor Framing

TASK PACKAGE 4.3: Floor Joists

PREREQUISITES: Units 1-3; Unit 4, Task Package 4.1-4.2

RATIONALE:

After construction of the beam or girder, the carpenter will proceed to cut and install the floor joists, which normally rest on the ledger strip of the beam and in the foundation wall. However, on the house you are constructing, the joists rest on the ledger strips and directly on the pillars, or are supported by cross members called headers. In this task package you will learn to cut and properly install floor joists in accordance with plans and specifications provided by your instructor. Continue by reading the performance objective and doing the learning activity and learning practice.

PERFORMANCE OBJECTIVE:

Upon completion of this task package, you will be able to cut and install floor joists in accordance with plans provided by your instructor to the following standards:

1. Joists are cut to correct length ($\pm$ 1/16").
2. Joists are positioned on 16" centers ($\pm$ 1/16").
3. Joists' crowns are installed in the up position.
4. Floor joists are nailed properly.
5. Double joists are positioned under load-bearing partitions.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package 4.3.
2. Read pages 121-126 in Modern Carpentry, beginning with section entitled "Joists" and ending with "Bridging."
3. Read pages 61-66 in Fundamentals of Carpentry, Volume II, ending with the section entitled "Rough Flooring."
4. This completes the learning activity. Begin the learning practice.

LEARNING PRACTICE:

Tools and Equipment:

1. Hammer
2. 16d nails
3. Crosscut saw or electric circular saw
4. 2" x 8" stock
5. Framing square
6. Combination square
7. Pencil
8. Folding wood rule
9. 100' layout tape

1. According to the plans provided by the instructor, lay out the position for the joists, 16" on centers, on the beam and on the header. (See figures 7-24 and 7-27, pages 121-122 in Modern Carpentry.)
2. Lay out and cut the joists to the correct length. Cut double joists where they are required under load-bearing partitions or around an opening. (See figures 7-26, 7-28, and 7-31, pages 122-123 in Modern Carpentry.)
3. Notch out joists to fit on the ledger strips of the beam so that the top and bottom of the joists are flush with the top and bottom of the beam. (Similar to figure 7-16, page 119 in Modern Carpentry and figure 11, page 62 in Fundamentals of Carpentry, Volume II.)
4. Nail double joists together following procedure shown in figures 7-29 and 7-30, page 123 in Modern Carpentry.
5. Nail joists in place on the beam and attach them to the header as shown in figure 7-31, on page 123 of Modern Carpentry. Note: Make sure the joists' crowns are installed in the up position.
6. Attach double header as shown in figure 7-35, page 126 in Modern Carpentry.
7. After you have completed the job, evaluate yourself according to the performance objective. Then ask for your instructor's evaluation.
8. When satisfied with your completed work, the instructor will indicate that you should begin the next task package.

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CARPENTRY PERFORMANCE AREAS

1. PRE-CONSTRUCTION OPERATIONS

   1.1 Blueprint Reading
   1.2 Site Layout
   1.3 Transit Level and/or Builder's Level

2. TOOLS AND EQUIPMENT

   2.1 Hand Tools
   2.2 Power Tools

3. FOOTING, FOUNDATION, AND CONCRETE FORMS

   3.1 Footing and Foundation Walls
   3.2 Wall Forms
   3.3 Flat Slabs
   3.4 Column, Beam, and Girder Forms
   3.5 Concrete Stairs

4. FLOOR FRAMING

   4.1 Sill Plates
   4.2 Beams and Girders
   4.3 Joists
   4.4 Openings
   4.5 Bridging
   4.6 Sub-Flooring

5. WALL FRAMING

   5.1 Plates
   5.2 Studs
   5.3 Corners
   5.4 Partitions
   5.5 Sheathing
   5.6 Metal Stud Systems

6. ROOF FRAMING

   6.1 Roof Shapes and Nomenclature
   6.2 Common Rafter
   6.3 Gable End Framing
   6.4 Hip and Hip Jack Rafters

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6.5 Valley and Valley Jack Rafters
6.6 Dormer Framing
6.7 Roof Sheathing
6.8 Roof Joists
6.9 Laminated Arches and Beams
6.10 Truss Erection

7. ROOFING

7.1 Asphalt and Wood Shingles
7.2 Built-Up Roofing
7.3 Roof Drains and Stacks

8. WOODEN AND METAL SCAFFOLDS

8.1 Prefabricated Metal Scaffolds
8.2 Pump Jack Scaffold
8.3 Post and Ledger Scaffold

9. EXTERIOR FINISH

9.1 Cornice Work
9.2 Window and Door Jambs
9.3 Exterior Siding
9.4 Gutters and Downspouts

10. INSULATION AND VAPOR BARRIERS

10.1 Batt and Blanket Insulation
10.2 Reflective Insulation
10.3 Loose Fill Insulation
10.4 Vapor Barriers
10.5 Acoustical Insulation

11. INTERIOR FINISH

11.1 Interior Wall Coverings
11.2 Plastic Laminates
11.3 Hardwood Flooring
11.4 Doors
11.5 Molding and Trim
11.6 Cabinet Installation
11.7 Stair Construction

CARPENTRY PERFORMANCE OBJECTIVES

Given the proper tools, materials and conditions, the student will be able to:

1. PRE-CONSTRUCTION OPERATIONS

1.1 Blueprint Reading

1.1.1 Interpret and use lines, symbols, abbreviations, specifications and dimensions on working drawings which are necessary to execute carpentry tasks without consultation.

1.2 Site Layout

1.2.1 Locate information on working drawings, without consultation, to determine site layout.

1.2.2 Lay off building lines and elevations, to accuracy, using tape and builder's level and/or transit.

1.2.3 Place rough stakes at location of building corners measured from lot lines.

1.2.4 Set batter board stakes at a uniform distance from building corners, avoiding interference with excavation operations.

1.2.5 Establish elevations on batter board stakes in reference to datum point, with proper incremental adjustments.

1.2.6 Level cross pieces for batter boards and fasten accurately with joint tight and rigid when nails are completely driven.

1.2.7 Lay out and place lines on batter boards for final layout to within 1/8".

1.3 Transit Level and/or Builder's Level

1.3.1 Set up transit and/or builder's level and adjust to level.

1.3.2 Transfer an established elevation and/or increments thereof to a location in line or at angles to accuracy.

1.3.3 Establish a square corner in reference to an established line to accuracy.

2. TOOLS AND EQUIPMENT

2.1 Hand Tools

The student will be able to safely use and maintain the following hand tools in performing carpentry tasks:

2.1.1 Measuring, layout and testing tools

- 2.1.1.1 Folding rule
- 2.1.1.2 Steel tape
- 2.1.1.3 Combination square
- 2.1.1.4 Framing square
- 2.1.1.5 Dividers
- 2.1.1.6 Sliding T-bevel
- 2.1.1.7 Scriber
- 2.1.1.8 Butt gage

2.1.2 Leveling tools

- 2.1.2.1 Chalk line
- 2.1.2.2 Plumb bob
- 2.1.2.3 Spirit level
- 2.1.2.4 Builder's level and/or transit level

2.1.3 Cutting tools

- 2.1.3.1 Crosscut handsaw
- 2.1.3.2 Rip handsaw
- 2.1.3.3 Coping saw
- 2.1.3.4 Keyhole saw

2.1.3.5 Miter box saw
2.1.3.6 Hacksaw
2.1.3.7 Wood chisels
2.1.3.8 Hatchet
2.1.3.9 Utility knife

2.1.4 Smoothing tools

2.1.4.1 Block plane
2.1.4.2 Smooth plane
2.1.4.3 Jack plane
2.1.4.4 Wood rasps and files
2.1.4.5 Abrasive papers

2.1.5 Boring tools

2.1.5.1 Brace with auger and expansion bits
2.1.5.2 Hand drill

2.1.6 Holding tools

2.1.6.1 Vises
2.1.6.2 C-clamp
2.1.6.3 Bar clamp
2.1.6.4 Saw horse

2.1.7 Assembling tools

2.1.7.1 Curved claw hammer
2.1.7.2 Straight claw hammer
2.1.7.3 Stapler
2.1.7.4 Standard screwdriver
2.1.7.5 Phillips screwdriver
2.1.7.6 Ratchet screwdriver
2.1.7.7 Adjustable wrench
2.1.7.8 Combination pliers
2.1.7.9 Nail sets

2.1.8 Wrecking tools

2.1.8.1 Wrecking or pry bar
2.1.8.2 Nail puller
2.1.8.3 Sledge hammer

2.1.9 Sharpening tools

2.1.9.1 Oilstone

2.1.9.2 Files
2.1.9.3 Hand grinder

2.2 Power Tools

The student will be able to safely operate and maintain the following power tools in performing carpentry tasks:

2.2.1 Circular saw
2.2.2 Radial arm saw
2.2.3 Saber saw
2.2.4 Electric hand drill
2.2.5 Portable electric plane
2.2.6 Power nailer
2.2.7 Portable router
2.2.8 Portable sander
2.2.9 Electric plane
2.2.10 Power miter box

3. FOOTING, FOUNDATION, AND CONCRETE FORMS

3.1 Footing and Foundation Walls

3.1.1 Locate information on working drawings to determine the placement of footing and foundation walls and/or established building lines without consultation.

3.1.2 Check earth forms for squareness and structural soundness.

3.1.3 Lay off and cut materials for footing and foundation wall forms to within 1/16".

3.1.4 Assemble forms for strength and easy disassembly.

3.1.5 Lay off placement of forms to within 1/16", with corners square to 1/16" within a 6'-8'-10' triangle.

3.1.6 Place forms to layout marks to within 1/8".

3.1.7 Fasten forms for structural soundness at base.

3.1.8 Straighten forms using string line and gage blocks to within 1/8".

3.1.9 Plumb forms using spirit level, transit, or plumb bob.

3.1.10 Brace forms for structural soundness and to contain concrete pour.

3.2 Wall Forms

3.2.1 Locate information on working drawings, without consultation, to determine the placement of wall forms.

3.2.2 Lay off placement of wall forms to within 1/8", with corners square to within 1/8" in 6'-8'-10' triangle.

3.2.3 Lay off and properly locate bucks, nailing blocks, cleanout pockets, and girder pockets.

3.2.4 Erect outside forms in accordance with manufacturer's specifications or, if site-built, according to structural soundness.

3.2.5 Install strongbacks and walers with proper spacing and/or in accordance with manufacturer's specifications.

3.2.6 Cut and fasten braces and stakes for structural soundness.

3.2.7 Plumb and straighten wall forms to accuracy.

3.2.8 Establish height of concrete pour using transit level or string line to within 1/8".

3.2.9 Place inside forms in same manner as outside forms to within 1/8" accuracy throughout.

3.2.10 Build and install bulkheads and keyways for structural soundness.

3.3 Flat Slabs

3.3.1 Locate information on working drawings, without consultation, to determine the placement of flat slabs.

3.3.2 Lay off placement of on-grade and above-grade slab forms to within 1/8", with corners square to 1/8" within 6'-8'-10' triangle.

3.3.3 Erect shoring and forms in accordance with manufacturer's specifications or, if site-built, according to structural soundness.

3.3.4 Install braces and stakes for structural soundness and concrete pour.

3.3.5 Plumb and straighten slab forms to accuracy.

3.3.6 Establish height of concrete pour using transit, builder's level, or string line to within 1/8".

3.4 Column, Beam and Girder Forms

3.4.1 Locate information on working drawings, without consultation, to determine the placement of column, beam, and girder forms.

3.4.2 Lay off placement of column, beam, and girder forms to within 1/8".

3.4.3 Assemble manufactured and/or site-built column, beam and girder forms with proper fasteners for strength and easy disassembly.

3.4.4 Erect column, beam, and girder forms for structural soundness, proper location, and concrete pour.

3.4.5 Install clamps, jacks, strongbacks and walers with proper spacing.

3.4.6 Plumb and straighten column, beam, and girder forms to accuracy.

3.4.7 Establish height of concrete pour using transit, builder's level, or string line to within 1/8".

3.5 Concrete Stairs

3.5.1 Locate information on working drawings, without consultation, to determine the placement of concrete stair forms.

3.5.2 Design stair forms for structural soundness, with provisions for railings or gates, correct tread and rise, and ease of dissassembly.

3.5.3 Lay off and cut materials for stair forms to within 1/8".

3.5.4 Nail stair forms with joints tight and rigid, with access for cement finishing, and for ease of disassembly.

3.5.5 Erect stair forms to be plumb, structurally sound, and at correct height for the finished floor.

4. FLOOR FRAMING

4.1 Sill Plates

4.1.1 Check sill plate for straightness by sighting down member to determine workable deflection.

4.1.2 Locate information on working drawings, without consultation, to determine the placement of sill plate on foundation wall.

4.1.3 Locate sill plate on foundation with chalk line or string line within 1/16" for every 20' of length.

4.1.4 Establish corner locations and check corners for squareness, using the 3-4-5 triangle method with a minimum of 6'-8'-10' for accuracy within 1/16".

4.1.5 Locate anchor bolt centers in relation to established lines, and transfer locations to sill plate within 1/16".

4.1.6 Drill a plumb hole at bolt locations through sill plate to facilitate application of sill plate to foundation wall according to established line.

4.1.7 Place sill plate on foundation wall in accordance with plans and local building codes. Secure to foundation, with voids filled and plate level within 1/8" for every 20' of length.

4.2 Beams and Girders

4.2.1 Locate information on working drawings, without consultation, to determine the type and placement of beams and girders.

4.2.2 Check materials for built-up wood beams and girders by sighting down each member to determine workable deflection.

4.2.3 Lay off and cut materials for beams and girders to length within 1/8" accuracy.

4.2.4 Fabricate built-up wood beams and girders with proper size and number of fasteners to provide structural soundness.

4.2.5 Attach beams and girders to bearing points providing a plumb and level location.

4.2.6 Install ledgers to beams and girders with proper fasteners to provide structurally sound bearing for joists.

4.3 Joists

4.3.1 Locate information on working drawings, without consultation, to determine the layout of floor framing members.

4.3.2 Check placement of girders and posts for location and ensure accurate level and plumb position within 1/16".

4.3.3 Select materials for stringer and header joists by sighting down each member to determine workable deflection.

4.3.4 Lay off and cut stringer and header joists to required length within 1/16".

4.3.5 Nail stringer and header joists into place with face and toe nailing in accordance with structural requirements. Hold members to within 1/16" of mark with joint tight and rigid when nails are completely driven.

4.3.6 Lay off, without cumulative errors, the placement of regular joists at correct spacing to accommodate plywood centers.

4.3.7 Lay off and cut regular joists to length within 1/16" accuracy.

4.3.8 Place regular joists in position with crown up and knots at top where possible.

4.3.9 Nail regular joists into place in accordance with structural requirements. Hold members to within 1/16" of mark, with joint tight and rigid when nails are completely driven.

4.4 Openings

4.4.1 Locate information on working drawings, without consultation, to determine the layout of framing members for a floor opening.

4.4.2 Lay out floor openings in a way that provides end nailing for strength and ease of assembly.

4.4.3 Lay off and cut framing members for a floor opening to within 1/16" accuracy.

4.4.4 Nail the framing members of a floor opening in the proper sequence and location to within 1/16", with the joint tight and rigid when nails are completely driven.

4.5 Bridging

4.5.1 Install bridging in accordance with local building codes.

4.5.2 Use a framing square to determine the angle for end cuts and length of bridging, and transfer information to bridging material to provide a tight and rigid joint.

4.5.3 Cut bridging material to length within 1/16" accuracy.

4.5.4 Install bridging with lower end left loose until after installation of sub-flooring, settling of floor and shrinkage of joists has occurred. Then nail in proper location to prevent splitting bridging material.

4.6 Sub-Flooring

4.6.1 Place end joints of sub-flooring so that adjacent rows do not have end joints on same joists or between joists.

4.6.2 Measure for placement of first row of sheet material sub-flooring to within 1/16".

4.6.3 Strike chalk line accurately to established mark.

4.6.4 Place sub-flooring so that the face grain runs perpendicular to the direction of the framing members.

4.6.5 Place sub-flooring to chalk line with proper edge and end spacing in accordance with location, use, and atmospheric conditions. Staggered joints as required.

4.6.6 Fasten sub-flooring by starting in the corner and partially securing the first and then all remaining pieces until all are completely placed. Return and complete fastening with proper size and location of nails or staples.

4.6.7 Modify sub-flooring for openings with layout and cut to accuracy within 1/16".

5. WALL FRAMING

5.1 Plates

5.1.1 Locate information on working drawings to determine the layout of wall frame.

5.1.2 Lay off top and bottom plates simultaneously, properly locating door and window openings, and with stud spacing to fit a 4' x 8' wall sheet. Complete without unnecessary cutting with accuracy throughout to within 1/16".

5.1.3 Cut top and bottom plates to length within 1/16".

5.2 Studs

5.2.1 Lay off placement of story pole to include studs, stringers, cripples, sills, and headers heights to within 1/16".

5.2.2 Lay off placement of headers and sills to length within 1/16".

5.2.3 Lay off and cut headers and sills to length in accordance with story pole to within 1/16" accuracy.

5.2.4 Nail studs into place holding member to within 1/16" of mark with joints tight and rigid when nails are completely driven.

5.2.5 Erect stud walls in proper sequence. Brace for squareness, plumb, align, and fasten into position to provide structural soundness and proper placement to receive the ensuing applications.

5.3 Corners

5.3.1 Install corner post for load bearing walls utilizing three studs and blocking to provide an interior nailing surface.

5.3.2 Install corner post with only two studs using cleats or metal clips for interior finish material.

5.3.3 Install double top plates, with overlap at corners for structural soundness, and corner squareness within 1/16" when gaged with a framing square.

5.4 Partitions

5.4.1 Locate information on working drawings, without consultation, to determine the placement of interior partitions.

5.4.2 Lay off and cut to within 1/16" accuracy the backing blocks, or two studs as backing, to provide structural soundness and support for interior finish.

5.4.3 Nail backing blocks or two studs as backing with face and toe nailing. Hold member to within 1/16" of mark with joint tight and rigid when nails are completely driven.

5.4.4 Locate information on working drawings, without consultation, to determine the layout of partition frame.

5.4.5 Lay off top and bottom plates simultaneously, properly locating openings in partition and with stud spacing to fit 4' x 8' wall sheets. Complete without unnecessary cutting with accuracy throughout to 1/16".

5.4.6 Cut top and bottom plates to length within 1/16".

5.4.7 Lay off story pole to include studs, cripples, sills, and headers heights within 1/16".

5.4.8 Lay off partition sills and headers to length to within 1/16".

5.4.9 Lay off and cut members to length in accordance with story pole within 1/16".

5.4.10 Nail partition studs into place, holding member to within 1/16" of mark, with joints tight and rigid when nails are completely driven.

5.4.11 Erect partitions in proper sequence. Brace for squareness, plumb, align, and fasten into position to provide structural soundness and proper placement.

5.5 Sheathing

5.5.1 Measure and strike chalk line for placement of initial row of sheet material to within 1/16".

5.5.2 Place panels to chalk line with proper edge and end spacing in accordance with location, use, and atmospheric conditions. Stagger joints as required.

5.5.3 Nail panels partially secure until all are placed, then return and completely fasten.

5.5.4 Modify panels for openings with layout and cut to accuracy within 1/16".

5.6 Metal Stud Systems

5.6.1 Follow similar layout practices as with non-load bearing partitions, utilizing channel type studs and runners in accordance with manufacturer's specifications.

5.6.2 Lay out and cut metal studs and runners to provide joints free from vibration, movement, and twist on impact.

5.6.3 Install wood backing and headers in metal stud partition for structural soundness.

6. ROOF FRAMING

6.1 Roof Shapes and Nomenclature

6.1.1 Locate information on working drawings, without consultation, to determine types, unit measurements, ties or braces, and placement of roof framing members.

6.2 Common Rafter

6.2.1 Determine common rafter length using tables, a framing square, or by any other accepted practice. Lay off to within 1/16".

6.2.2 Lay off ridge board and plate for placement of common rafter, with rafter spacing to fit 4' x 8' roof sheathing. Complete without unnecessary cutting with accuracy throughout to within 1/16".

6.2.3 Lay off and cut common rafter for ridge, seat and projection cuts to within 1/16".

6.2.4 Using face and toe nailing, nail common rafter into position in accordance with structural requirements. Hold rafter to within 1/16" of mark with joint tight and rigid when nails are completely driven.

6.3 Gable End Framing

6.3.1 Locate information on working drawings, without consultation, to determine the layout of the gable end frame.

6.3.2 Lay off common differences in length and angle cuts for gable studs to within 1/16".

6.3.3 Lay off rafter and plate to receive gable studs, with stud spacing to fit a 4' x 8' wall sheet. Complete without unnecessary cutting with accuracy throughout to 1/16".

6.3.4 Cut gable studs to within 1/16".

6.3.5 Nail gable stud into position in accordance with structural requirements. Hold stud to within 1/16" of mark with joint tight and rigid when nails are completely driven.

6.4 Hip and Hip Jack Rafters

6.4.1 Determine hip rafter length to within 1/16" using tables, a framing square, or by any other accepted method.

6.4.2 Lay off and cut hip rafters at ridge, seat and projection to within 1/16".

6.4.3 Lay off plates, ridge, and hip rafter for placement of hip and hip jacks to fit 4' x 8' roof sheathing. Complete without unnecessary cutting to within 1/16".

6.4.4 Determine hip jack length and difference in length for successive jacks using tables, framing square, or by any other method. Lay out to within 1/16".

6.4.5 Lay off and cut for hip jack at ridge seat and projection to within 1/8".

6.4.6 Nail hip and jack rafters into place with face and toe nailing in accordance with structural requirements. Hold rafters to within 1/16" of mark with joint tight and rigid when nails are completely driven.

6.5 Valley and Valley Jack Rafters

Same objectives as 6.4.1 through 6.4.6, changing "hip" or "hip jack" to read "valley" or "valley jack."

6.6 Dormer Framing

6.6.1 Locate information on working drawings, without consultation, to determine the layout of roof framing members for a dormer opening.

6.6.2 Lay off rafters and headers in an order that provides end nailing for strength and ease of assembly.

6.6.3 Cut rafters and headers to required length within 1/16".

6.6.4 Nail the framing members for dormer opening in proper sequence to within 1/16" of mark, with joint tight and rigid when nails are completely driven.

6.6.5 Locate information on working drawings, without consultation, to determine the placement of dormer wall frame.

6.6.6 Lay off studs, stringers, cripples, sills and headers to within 1/16".

6.6.7 Cut dormer wall framing members to length to within 1/16".

6.6.8 Nail dormer wall frame into place holding member to within 1/16" of mark, with joint tight and rigid when nails are completely driven.

6.6.9 Locate information on working drawings, without consultation, to determine the types, unit measurement, and placement of dormer roof framing members.

6.6.10 Determine dormer rafter length to within 1/16" using tables, a framing square, or by any other method.

6.6.11 Lay off and cut dormer rafter for cuts at ridge seat and projection to within 1/8".

6.6.12 Nail dormer rafter into place in accordance with structural requirements. Hold rafter to within 1/16" of mark with joint tight and rigid when nails are completely driven.

6.7 Roof Sheathing

See objectives in 5.5.1 through 5.5.4.

6.8 Roof Joists

6.8.1 Locate information on working drawings, without consultation, to determine the placement of roof joists.

6.8.2 Without consultation, select lumber for roof joists for structural soundness with the additional load of roofing material, snow and live loads as per specifications.

6.8.3 Lay off and cut roof joists to length, with taper for drainage, to accuracy within 1/16".

6.8.4 Lay off roof stub joists and diagonal joists to within 1/16". Keep the first stub joist as far from the corner as is the last regular roof joist.

6.8.5 Cut roof stub and diagonal joists to within 1/16".

6.8.6 Lay off plates to receive roof joists and roof decking.

6.8.7 Nail stub, diagonal, and regular roof joists into place to within 1/16" accuracy, with joint tight and rigid when nails are completely driven.

6.8.8 Select proper stock for joist blocking.

6.8.9 Lay off blocking material to fit joist opening to within 1/16", and to provide nailing surface for soffit.

6.8.10 Cut blocking material to within 1/16".

6.8.11 Nail blocking material into place to within 1/16" of mark, with joint tight and rigid when nails are completely driven.

6.9 Laminated Arches and Beams

6.9.1 Locate information on working drawings, without consultation, to determine the placement of arches and/or beams.

6.9.2 Square, plumb, and level anchoring devices for arches and/or beams bearing.

6.9.3 Lay off arches and beams to length and anchoring to accuracy within 1/32".

6.9.4 Cut arches and/or beams to within 1/32".

6.9.5 Drill a plumb and square hole at bolt locations to facilitate anchoring of arches and/or beams.

6.9.6 Place arches and/or beams in accordance with plans. Secure bearing surfaces and bolts with temporary bracing.

6.10 Truss Erection

6.10.1 Locate information on working drawings, without consultation, to determine the placement of trusses.

6.10.2 Without cumulative error, lay off wall plates for truss placement to accommodate plywood centers on truss centers.

6.10.3 Lay off trusses to provide alignment on bearing walls or establish string line to within 1/16".

6.10.4 Place trusses on walls, upside down, to accommodate efficient erection.

6.10.5 Swing up, align, temporarily brace, and fasten trusses with face and/or toe nailing. Hold members to within 1/16" of mark with joint tight and rigid when nails are completely driven.

7. ROOFING

7.1 Asphalt and Wood Shingles

7.1.1 Locate information on working drawings, without consultation, to determine materials and/or manufacturer's specifications for shingle installation.

7.1.2 Establish chalk lines for felt paper placement with eave and lap spacing to within 1/4" for every 40'.

7.1.3 Place felt paper to established chalk line with surface clean and layers flush.

7.1.4 Nail felt paper with proper nails and adequate placement to ensure waterproof underlayment.

7.1.5 Measure for and strike chalk line for shingles to within 1/8" for horizontal or vertical lines. Allow for proper spacing and increase as valley descends for open valley layout.

7.1.6 Lay shingles using corrosion and rust resistant nails. Locate according to manufacturer's specifications.

7.1.7 Lay shingles with proper staggering and exposure in accordance with manufacturer's specifications.

7.1.8 Lay shingles with 1/4" to 3/8" overhang at rake.

7.1.9 Lay shingles with first course doubled and with lower course upside down. Shingles should sufficiently project beyond roof overhang to prevent water from entering eave treatment.

7.1.10 Cut shingles to form open or closed valley to prevent water "syphon" effect.

7.1.11 Lay shingles at hip or ridge with alternative lap, blind nailing, and flashing in accordance with manufacturer's specifications.

7.2 Built-Up Roofing

7.2.1 Locate information on working drawings, without consultation, to determine the type and placement of built-up roofing.

7.2.2 Lay a 1/3 sheet of felt, starting at the lowest or drain point of the roof, by nailing or sprinkle-mopping.

7.2.3 Solid mop the 1/3 sheet and embed the remaining 2/3 sheet.

7.2.4 Solid mop the 2/3 sheet and embed a full sheet.

7.2.5 Proceed up the incline, lapping each sheet with exposure required for number of plies.

7.2.6 Apply hot asphalt and spread gravel avoiding low spots and "double rock" hips and ridges.

7.2.7 Apply capsheet to roof slopes in accordance with built-up roof specifications.

7.2.8 Fold inside corner for capsheet or place chamfer in such a way that edges do not impede the normal flow of water. Seal the entire assembly with flashing compound, providing for a watertight surface.

7.3 Roof Drain and Stacks

7.3.1 Without consultation, locate information on working drawings and/or manufacturer's specifications for installing roof drain and/or stacks.

7.3.2 Install roof drain in accordance with manufacturer's specifications.

7.3.3 Place flashing for roof stacks in accordance with manufacturer's specifications.

8. WOODEN AND METAL SCAFFOLDS

8.1 Prefabricated Metal Scaffolds

8.1.1 Assemble and safely use prefabricated metal scaffolds according to manufacturer's specifications.

8.2 Pump Jack Scaffold

8.2.1 Assemble and safely use a pump jack scaffold according to manufacturer's specifications.

8.3 Post and Ledger Scaffold

8.3.1 Construct and safely use a 2 x 4 post and ledger scaffold.

9. EXTERIOR FINISH

9.1 Cornice Work

9.1.1 Locate information on working drawings, without consultation, for placement of cornice.

9.1.2 Establish string line to determine alignment of rafter ends to within 1/8".

9.1.3 Cut rafter ends as required by aligning procedure to within 1/16".

9.1.4 Measure end rafters to same height. Establish chalk line on rafter ends for placement of fascia to within 1/16".

9.1.5 Lay off fascia boards to length with joints smooth and on bearing points to within 1/16".

9.1.6 Cut fascia using miter or butt cuts to within 1/16".

9.1.7 Nail fascia to rafter ends with joint tight, rigid, and aligned when nails are completely driven.

9.1.8 Lay off materials for box cornice with soffit vents to within 1/16".

9.1.9 Cut box cornice materials to within 1/16".

9.1.10 Nail box cornice materials with joints sealed tight and rigid when nails are completely driven.

9.2 Window and Door Jambs

9.2.1 Locate information on working drawings, without consultation, for the placement of windows and doors.

9.2.2 Lay off manufactured jambs as necessary for openings to within 1/16".

9.2.3 Cut jamb to within 1/16".

9.2.4 Install jamb assembly at correct height and location to within 1/16".

9.2.5 Place shims behind hinges. Strike plate for doors, and at mid-point of sill and top for windows.

9.2.6 Level and plumb jambs to accuracy.

9.2.7 Nail jambs into position with joint tight and rigid when nails are completely driven. Drive nails at angle to avoid pull-out.

9.3 Exterior Siding

9.3.1 Locate information on working drawings, without consultation, to determine the placement of exterior siding.

9.3.2 Lay off and cut exterior siding for appropriate lay, openings, and edge treatment to within 1/16".

9.3.3 Nail exterior siding plumb and level,with joint tight and rigid when nails are completely driven.

9.3.4 Apply corner treatment to exterior siding in accordance with manufacturer's specifications.

9.4 Gutters and Downspouts

9.4.1 Locate information on working drawings, without consultation, to determine the placement of gutters and downspouts.

9.4.2 Using the chalk line, lay off fascia to receive gutter for proper amount of fall.

9.4.3 Nail gutter in place with joints sealed, tight and rigid, and end capped when nails are completely driven.

9.4.4 Install downspouts at proper location with joints sealed and secure, and with strap tight and rigid to wall.

10. INSULATION AND VAPOR BARRIERS

10.1 Batt and Blanket Insulation

10.1.1 Locate information on working drawings, without consultation, to determine the placement of batt and blanket insulation.

10.1.2 Cut batt and blanket slightly larger than the space to be insulated.

10.1.3 Staple batt and blanket to the sides of studs, plates, and joists to prevent air circulation.

10.2 Reflective Insulation

10.2.1 Locate information on working drawings, without consultation, to determine the placement of reflective insulation.

10.2.2 Install reflective insulation with minimum of 3/4" air space in walls and 1-1/2" minimum in floors and ceilings.

10.3 Loose Fill Insulation

10.3.1 Locate information on working drawings, without consultation, for the placement of loose fill insulation.

10.3.2 Level loose fill insulation to proper depth with leveling board pulled across a pair of joists to achieve consistent thickness.

10.4 Vapor Barriers

10.4.1 Locate information on working drawings, without consultation, for the placement of vapor barriers.

10.4.2 Place vapor barriers in wall, floor, or ceiling on warm side of insulation or space with minimum of 3" lap.

10.4.3 Place vapor barrier on the ground with minimum lap of 6".

10.5 Acoustical Insulation

10.5.1 Locate information on working drawings, without consultation, for the placement of acoustical insulation.

10.5.2 Install acoustical insulation in accordance with manufacturer's specifications to maintain sound reduction throughout.

11. INTERIOR FINISH

11.1 Interior Wall Coverings

11.1.1 Locate information on working drawings, without consultation, for the placement of interior wall coverings.

11.1.2 Check alignment of walls and straighten as required without damaging structural soundness.

11.1.3 Place first corner piece in plumb position.

11.1.4 Scribe inside corner as required to match irregularities.

11.2.5 Lay off and cut for openings and outside corner to within 1/16".

11.2.6 Fasten wall covering into position with nails or glue without damaging material. Work in accordance with manufacturer's specifications or local practices.

11.2 Plastic Laminates

11.2.1 Locate information on working drawings, without consultation, for the placement of plastic laminates.

11.2.2 Fabricate base to receive plastic laminate with surface smooth, joints tight, and nails flush.

11.2.3 Lay off self edge and top laminate to fit base, with adequate amount for trimming edges.

11.2.4 Cut plastic laminate to mark without damage to material.

11.2.5 Check fit of laminate to base for squareness and length.

11.2.6 Apply contact cement to base and back of laminate to provide uniform surface contact.

11.2.7 Place laminate on base squarely with cement set, and roll surface for uniform contact.

11.2.8 Trim laminate to provide smooth edge and neat appearance.

11.3 Hardwood Flooring

11.3.1 Locate information on working drawings, without consultation, for the placement of hardwood flooring.

11.3.2 Measure and strike line for laying row with proper clearance from wall.

11.3.3 Measure and cut end pieces to within 1/8".

11.3.4 Place flooring pieces, staggering end joints no closer than 6" to adjacent row.

11.3.5 Nail flooring with joints tight and rigid. Use nail set for end pieces without damage to floor.

11.4 Doors

11.4.1 Locate information on working drawings, without consultation, for the placement of doors.

11.4.2 Determine dimensions of openings to within 1/32".

11.4.3 Lay off door to size to within 1/32", with proper clearances on all sides.

11.4.4 Cut door to within 1/32" with bevel on lock side.

11.4.5 Lay off for hinges and lock set to within 1/16" with proper position and clearance.

11.4.6 Make cuts for hinges and lock set layout to within 1/32".

11.4.7 Install hardware and hang door in place with proper clearances.

11.5 Molding and Trim

11.5.1 Locate information on working drawings, without consultation, to determine the placement of molding and trim.

11.5.2 Lay off straight run trim to overall length to within 1/16", with intermediate joints at support points.

11.5.3 Cut trim to length within 1/32" with miter cut.

11.5.4 Nail trim into supporting structure with nails properly set so as not to damage trim.

11.5.5 Lay off and cut trim for inside corner to within 1/32".

11.5.6 Lay off and cut trim for outside corner to within 1/32".

11.6 Cabinet Installation

11.6.1 Locate information on working drawings, without consultation, for the placement of cabinets.

11.6.2 Place cabinet into correct location within 1/16", level and plumb accurately, and scribe as required.

11.6.3 Cut to scribe as required within 1/32".

11.6.4 Fasten cabinet into position for structural soundness.

11.7 Stair Construction

11.7.1 Locate information on working drawings, without consultation, for the placement of stairs.

11.7.2 Determine distance between floors to within 1/16".

11.7.3 Using math or step-off method, determine riser and tread dimensions to equal dimensions throughout.

11.7.4 Determine modifications necessary at top and bottom of stringer to maintain uniform riser heights to within 1/16".

11.7.5 Select stringer stock for structural soundness and proper dimension.

11.7.6 Lay off stringer for riser, tread, and end cuts using framing square to within 1/16".

11.7.7 Cut stringer for riser, tread, and end cuts to within 1/16".

11.7.8 Fasten, level, and plumb stringer into place.

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